IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	)
	) Atty. Docket No.: **ASAMU0005**
Jinko KIMURA et al.	)
	)
Serial No. 09/508,771	) Group Art Unit: 1752
	)
Filed: March 16, 2000	)
	) Examiner: Amanda C. WALKE
For: PHOTOSENSITIVE FILM	)
	)

ISHIKAWA'S SECOND DECLARATION UNDER 37 C.F.R. § 1.132

Assistant Commissioner for Patents
Washington, D. C. 20231

Sir:

1. I, Chikara ISHIKAWA, state that I am an inventor of, and an expert in the field of the presently claimed invention, as supported by my Curriculum Vitae, a copy of which was previously filed on December 11, 2002.

2. I am familiar with the above captioned application and claims. In this declaration, I submit my expert opinion regarding the scope of the teachings of U.S. Patent 4,360,582 to Taguchi et al. (hereafter, the Taguchi Patent). Based on my own knowledge and experience, and my review of the contents of the Taguchi Patent, the specification of the above-captioned application, and the teachings on pages 88-91 and 242-243 of the textbook titled "Plastic Films – Processing and Application (2nd Ed.)" edited by T. Okiyama (of record, and hereafter referred to as the "Plastic Films textbook"), which are sources of information an expert in my field would reasonably rely upon in rendering an opinion, it is my opinion that the Taguchi Patent does not teach, or suggest, a polypropylene film would inherently possess fish eyes having a

diameter of 80 μm included in the protecting film in numbers that do not exceed 5 fish eyes/m^2 when measured under a microscope at a multiplication of 100x. Furthermore, based on my own knowledge and experience, it is my expert opinion that the use of a microscope to characterize the fish eye population of a protecting film will produce a different measured result than when the fish eye population is examined using only the naked eye. The basis for my opinion is fully explained below.

Analysis of the Taguchi Patent

3. I have thoroughly reviewed the Taguchi Patent. My analysis and interpretation of the teachings of the Taguchi Patent are as follows.

4. The Taguchi Patent teaches a "photopolymerizable element" for producing photoresists used in manufacturing printed circuit boards that includes: (1) a layer of a photopolymerizable composition, (2) a film support laminated to the composition layer and optionally (3) a strippable protective film (see Abstract). The thickness of the composition layer is 0.1 to 1,000 μ (col. 9, lines 15-19) with the thickness of the film support being 5 to 100 μ (col. 9, lines 20-22) and the thickness of the protective film being 8 to 80 μ (col. 10, lines 22-23). Numerous materials are available for making the protective layer, but there is no mention of using low quality LDPE.

5. More specifically, the Taguchi Patent teaches the protective film is provided on one surface of the photopolymerizable layer and the film support is laminated onto the other surface, wherein the protective layer is used for preventing blocking at the winding step and adhesion of dust during handling (col. 3, lines 62-68). The Taguchi Patent teaches that the

film support is a transparent film capable of being dissolved or dispersed in a developer, and that the film support is selected from the group consisting of methyl methacrylate homopolymer and copolymers, vinyl chloride homopolymer and copolymers, polyvinyl alcohol, and mixtures thereof (col. 4, lines 51-62). The Taguchi Patent teaches the use of trimethylolpropane trimethacrylate as a photopolymerizable monomer for making a photopolymerizable layer, but that other materials such as the methyl methacrylate homopolymer and copolymer and a list of other compounds would be used as an organic polymer binder (col. 5, line 27, to col. 6, line 23).

6. The Taguchi Patent teaches that the use of polyethylene terephthalate as the film support has certain disadvantages, such a tendancy for the photosensitive layer to be destroyed when stripping the film support when the thickness of the photosensitive layer is reduced (col. 2, line 38, to col. 3, line 8). The Taguchi Patent also teaches the protective film could be selected from a polyethylene terephthalate film, a polypropylene film, a polyethylene film, a cellulose triacetate film, a cellulose diacetate film, a polyamide film, a polytetrafluoroethylene film, a paper, a polyethylene-laminated paper and a polypropylene-laminated paper (col. 10, lines 15-24).

7. I believe it is important that Taguchi teaches the protective film (10), such as shown in Figure 4, is an optional feature of the photopolymerizable element (col. 14, lines 57-60). I also believe it is important that, while Taguchi provides certain examples of a photosensitive element utilizing the optional protective film, these examples focus primarily on the use of a polyethylene film (col. 18, lines 9-52).

8. Furthermore, the Taguchi Patent explains the use of the photopolymerizable element referred to in Figures 1 to 9 (col. 14, line 43, to col. 15, line 35). As shown in Figure 5, the protective film (10), (e.g., a polypropylene film) is peeled off and the surfaces of the photopolymerizable layers (9) and (12) are applied to both surfaces of the copper-clad insulating substrate, whereby at least both openings of each of the through-holes (4), (5) are covered with the photopolymerizable layers (9) and (12), (See Fig. 5 and col. 14, line 59, to col. 15, line 1). The diameter of the through-holes (4) and (5), which have no relation to the fish eyes, are by far larger than the size of fish eyes. In view of these teachings, it is my expert opinion that the Taguchi Patent is not addressing the problem solved by the invention of the above-captioned application.

9. It is my understanding the Examiner contends the Taguchi Patent is silent regarding the subject matter of fish eyes (See Office Action, dated January 11, 2005, at 3, lines 11-13; and Office Action, dated March 24, 2004, at 4, lines 1-3). Based on my analysis of the Taguchi Patent, I agree that this document is completely silent with respect to fish eyes. However, based on my own knowledge and experience, and based on the teachings of the specification of the present application and the teachings of the Plastic Films textbook, in my opinion, a fish eye population having fish eyes of diameter 80 μm included in the protecting film in numbers that do not exceed 5 fish eyes/m^2, when measured under a microscope at a multiplication of 100x, is not a feature of the polypropylene protecting film of the Taguchi Patent. This feature would not flow naturally from the teachings of the Taguchi Patent. On the contrary, I conclude it is highly unlikely the polypropylene protecting film taught by the

Taguchi Patent would have the same number of fish eyes as recited in the independent claims 1, 19, 36, 38, 42 and 43. The basis for my conclusion is provided below.

Analysis of Other Information Sources

10. First, the specification of the above-captioned application states, in the section labeled "Background Art," it is known to use polyolefin protecting films, such as a polyethylene or polypropylene films, but these films generate high numbers of fish eye defects (See Specification, at 3, lines 2-28). More specifically, such conventional protecting films are produced by thermally melting and kneading a raw material, and then forming the film by extrusion, biaxial orientation or casting (See Specification, at 3, lines 5-10). Fish eyes are formed in the conventional protecting material due to either persistence of unmelted raw material, or formation of thermally deteriorated regions, during the melting of raw material (See Specification, at 3, lines 8-10). Based on my knowledge and experience in the field of producing protecting films for use in making photosensitive films, I agree fish eyes are formed in polyethylene films, and in polypropylene films, which are formed by thermal melting and kneading of a raw material. Fish eyes are due to incomplete melting of raw material, or formation of thermally deteriorated regions in the raw material, both of which occur due to non-uniform heating during the film formation process.

11. The present specification also discloses that protecting films used in the present invention have been specially produced by modifying the conventional manufacturing process, such as by adding an extra filtering step after thermal melting (See Specification at 14, lines 12-16). In accordance with this illustrative manufacturing technique, the protecting film can

be made to have fewer fish eyes by filtering out unmelted particles of raw material. Claims 39, 40 and 41 explicitly recite an embodiment wherein "the protecting film...is made of resin filtered after thermal melting." Additionally, the present specification provides examples of polypropylene films, which have been manufactured to meet the requirements of the present invention, such as Torayfan BO-2400 manufactured by Toray Industries, Inc. and ALPHAN E200 Series manufactured by Oji Paper Co., Ltd. (See Specification at 14, lines 17-22).

12. Based on the disclosure of the above-captioned application, and my own knowledge and experience in the art, I conclude protecting films used in the present invention are not run-of-the-mill protecting films, but are films carefully and deliberately manufactured to have fewer fish eye defects. This result may be achieved through additional processing steps, such as filtering the resin after the raw material has been heated, in order to remove unmelted particles. Furthermore, based on my review of the Taguchi Patent, I conclude there is no teaching, or suggestion, in the Taguchi Patent that would lead a person of ordinary skill in the art to believe the polypropylene films used by Taguchi, and described at col. 16, lines 59-63, and at col. 17, lines 32-36, are anything but conventional polypropylene films, which would have fish eyes far in excess of the "5 fish eyes/m^2" limit required by the present invention. In particular, I point out there is no teaching in the Taguchi Patent pertaining to, or even suggesting, (a) filtering the resin after thermal melting of the raw material in order to remove unmelted particles, or (b) the use of either a Torayfan BO-2400 polypropylene film or the use of an ALPHAN E200 Series polypropylene film, or (c) the application of any other manufacturing process for preventing the formation of fish eyes in the protective film.

13. Based on this information alone, I believe a person of ordinary skill in the art would recognize that the polypropylene films taught by the Taguchi Patent do not inherently include the characteristic wherein "the number of fish eyes having a diameter of at least 80 μm included in said protecting film...does not exceed 5 fish eyes/m^2 when measured under a microscope at a multiplication of 100."

14. Second, it is a known fact to those of ordinary skill in the art that not all polypropylene films inherently meet the limitation wherein "the number of fish eyes having a diameter of at least 80 μm included in said protecting film...does not exceed 5 fish eyes/m^2 when measured under a microscope at a multiplication of 100." This fact is established by my own knowledge and by Comparative Example 2 of Table 2 of the present application, which provides at least one example of a polypropylene protecting film that does not meet this limitation. Specifically, the polypropylene protecting film of Comparative Example 2 is a "PP-Type R" film manufactured by the Shin-Etsu Film Co. This film has about 1,200 fish eyes per m^2 having a diameter of at least 80 μm. Therefore, based on my own knowledge, and the data regarding the polypropylene film "PP-Type R" manufactured by the Shin-Etsu Film Co., I conclude polypropylene films do not typically have the characteristic wherein the number of fish eyes having a diameter of at least 80 μm included in the protecting film does not exceed 5 fish eyes/m^2 when measured under a microscope at a multiplication of 100.

15. Thirdly, the Plastic Film textbook teaches, in Table 2.12, that there are multiple different film forming methods for forming a polypropylene film, such as the inflation method,

casting (i.e., the "T-die method"), and stretching (See Plastic Film textbook, at 89). This, of course, is information I believe is generally known by those of ordinary skill in the art. The Plastic Film textbook also teaches, in Table 4.10, that various properties of a polypropylene film are affected by the film forming method employed (See Plastic Film textbook at 243). For example, film properties, such as specific gravity, tensile strength, breaking extension, tear propagation strength, and impact strength, vary significantly depending upon whether the polypropylene film is formed by casting or by biaxial stretching. Therefore, the Plastic Film textbook stands for the proposition that a property of a polypropylene film may vary significantly depending upon the method used to form the film.

16. In the present case, the Taguchi Patent is completely silent with respect to how the polypropylene protecting film is formed. Therefore, for a person of ordinary skill in the art, the Taguchi Patent lacks a disclosure sufficient to show what fish eye population would be the natural result flowing from its teachings. In other words, based on my review of the Taguchi Patent (which provides no description pertaining to how the polypropylene films mentioned therein were made), and based on my knowledge and experience in the art, and based on the Plastic Films textbook (which teaches variability in film properties depends upon how the film is formed), all of which are information sources reasonably relied upon by experts in my field when forming opinions, I conclude it is highly unlikely the polypropylene films mentioned in the Taguchi Patent would have the desired fish eye population wherein the number of fish eyes having a diameter of at least 80 μm included in the protecting film does not exceed 5 fish eyes/m^2 when measured under a microscope at a multiplication of 100. In particular, in my opinion, a polypropylene film randomly selected would not have the required number

of fish eyes, but would have a significantly greater fish eye population.

Use of Microscopes

17. Based on my knowledge and experience in the art, the use of a microscope may facilitate the characterization of the fish eye population of a protecting film, such as those protecting films used in the present invention. Many fish eyes larger than 80 μm are visible to the naked eye. However, those fish eyes that are about 80 to 90 μm in diameter are at the limits of human visual acuity, and may be missed without the use of a magnifier. Furthermore, even for those small fish eyes that may be seen with the naked eye, measurement accuracy is improved when a microscope is used. Therefore, based on my knowledge and experience in the field of evaluating fish eye defects in films, how a fish eye population is measured will effect measurement error, which will effect the ability of persons of ordinary skill in the art to compare the quality of different protecting films based on fish eye population. In other words, when characterizing fish eye populations, it matters whether the fish eye population was counted based on what is seen by the naked eye or whether the fish eye population was counted using a microscope or other magnifier.

Conclusions

18. Based on my knowledge and experience, and my review of (a) the Taguchi Patent, (b) the disclosure of the present application, and (c) the Plastic Films textbook, which are materials an expert in the field would reasonably rely upon in rendering an opinion, I conclude the following:

(a) the Taguchi Patent is completely silent regarding the number of fish eyes in the

polypropylene protecting films taught therein;

(b) the Taguchi Patent lacks a disclosure sufficient to show what fish eye population would be the natural result flowing from its teachings;

(c) as evident by the polypropylene protecting film "PP-Type R," manufactured by the Shin-Etsu Film Co., not all polypropylene protecting films inherently have the fish eye population wherein the number of fish eyes having a diameter of at least 80 μm does not exceed 5 fish eyes per m^2;

(d) as described in the specification of the above-captioned application, polypropylene protecting films having the required number of fish eyes are specially prepared using more involved manufacturing methods (i.e., including a resin filtering step to filter unmelted raw material from the resin) than are typically used, or are specifically selected polypropylene films (i.e., Torayfan BO-2400 or ALPHAN E200 Series polypropylene films); and

(e) that random polypropylene films, either prepared under run-of-the-mill conditions, or selected randomly without regard to the method of film formation, are unlikely to have a fish eye population limited to not exceeding 5 fish eyes per m^2 for fish eyes of at least 80 μm diameter.

19. Based on these conclusions, which are formed after considering materials used by experts in the field, it is my opinion the Taguchi Patent does not teach, or suggest, a polypropylene film would inherently possess fish eyes having a diameter of 80 μm included in the protecting film in numbers that do not exceed 5 fish eyes/m^2 when measured under a microscope at a multiplication of 100x.

20. Based on my knowledge and experience, I further conclude the following:

(f) the fish eye population of a protecting film is characterized based on human observation, therefore, it matters whether the fish eye population was counted based on what is seen by the naked eye or whether the fish eye population was counted using a microscope or other magnifier.

21. Based on this conclusion, it is my opinion that how a fish eye population is measured, whether using the naked eye or a microscope, is a limiting factor when comparing different protecting films.

22. I declare under penalty of perjury that the foregoing is true and correct, that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed by,

Date: June 1, 2005

Chikara Ishikawa

Chikara ISHIKAWA